BASSEVITCH, A.Z.

"Hydraulic Works in Precompressed Concrete" B 90827 27 Dec 1955
Fifth International Congress on Large Dams at Paris 23 May - 4 Jun 1955

Abstract available B-90827 27 Dec 1955

LOGINOV, F.G.; BASEVICH, A.Z.; BELOV, A.V.; VOZNESENSKIY, A.N.; GLEBOV, P.D.; KACHANOVSKIY, B.D.; KRAVTSOV, V.I.; LEVI, I.I.; MOROZOV, A.A.; NOSOV, R.P.; OKOROKOV, S.D.; PROSKURYAKOV, B.V.; STAROSTIN, S.M.; URAZOV, A.A.; CHERTOUSOV, M.D.; CHUGAYEV, R.R.; SHCHAVELEV, D.S.; YAGN, Yu.I.

V.S.Baumgart.; obituary. Gidr.stroi. 25 no.5:58 Je '56. (MLRA 9:9)
(Baumgart, Vladimir Sergeevich, d.-1956)

BASEVICH, A.Z., prof.

Method of stressing concrete used in structures of the Kakhovka and Stalingrad hydroelectric stations. Gidr.stroi. 26 no.8:1-7 Ag '57. (MIRA 10:10)
(Reinforced concrete construction) (Hydraulic engineering)

BASEVICH, Akim Zakharovich; VASIL'YEV, P.I., kand. tekhn. nauk, nauchnyy red.; KAPLAN, M.Ya., red. izd-va; PUL'KINA, Ye.A., tekhn. red.

[Massive hydraulic structures with artificially induced contraction of concrete] Massivnye gidrotekhnicheskie sooruzheniia s iskusstvennym obzhatiem betona. Leningrad, Gos. izd-vo lit-ry po stroit. i arkhit., 1957. 198 p. (MIRA 11:7)
(Hydraulic engineering) (Concrete)

BASEVICH, A. Z.: Doc Tech Sci (diss) -- "The design of massive hydraulic-engineering structures with artificial shrinkage of the concrete". Leningrad, 1958. 38 pp (Min Higher Educ USSR, Leningrad Polytech Inst im M. I. Kalinin), 150 copies (KL, No 5, 1959, 148)

~~BASEVICH, A.Z.~~

New practical methods of redistributing stresses in massive Hydraulic structures. Nauch.-tekh.inform.biul.LPI no.1/2:8-16. '58. (MIRA 12:6)

(Hydraulic engineering)
(Strains and stresses)

BASEVICH, A.Z., prof.

Reducing the weight of concrete gravity dams on rock foundations.
Izv. VNIIG 60:18-27 '58. (MIRA 13:6)
(Dams)

NEPOROZHNIY, P.S.; BELYAKOV, A.A.; VOZNESENSKIY, A.N.; GLEBOV, P.D.; KACHANOVSKIY, B.D.; BASEVICH, A.Z.; TARTAKOVSKIY, D.M.; VASIL'YEV, P.I.; ZARUBAYEV, N.V.; CHUGAYEV, R.R.; KOZHEVNIKOV, M.P.; KNOROZ, V.S.; IVANOV, P.L.; SHCHAVELEV, D.S.; OKOROKOV, S.D.; BELOV, A.V.; STAROSTIN, S.M.; YAGN, Yu.I.; IZBASH, S.V.

Ivan Ivanovich Levi; on his 60th birthday. Gidr. stroi. 30 no.9:61-62 S '60. (MIRA 13:9)
(Levi, Ivan Ivanovich, 1900-)

BASEVICH, A. Z., doktor tekhn. nauk, prof.; SOKOLOV, I. B., inzh.

Coordinating conference on studies of characteristics of hydraulic concrete and reinforced concrete subject to static and dynamic loading. Gidr. stroi. 33 no.12:55-57 D '62.
(MIRA 16:1)

(Concrete—Testing)

KOSHEVNIKOV, Georgiy Antonovich, akademik; KHAMIDOV, Aslam, kand. tekhn. nauk; KOTOV, Vladimir Fedorovich; GERASIMOV, Mikhail Fedorovich; BASEVICH, Lev Yefimovich; BUTYRIN, Aleksandr Vasil'yevich; RAYEV, Boris Grigor'yevich; BONDARENKO, M., red.; SALAKHUTDINOVA, A., tekhn. red.

[Machinery for cultivating cotton] Mashiny dlia vozdelyvaniia khlopchatnika. Tashkent, Gosizdat UzSSR, 1961. 182 p. (MIRA 15:7)

1. Nachal'nik otdela Gosudarstvennogo spetsial'nogo konstruktorskogo byuro (for Kotov). 2. Rukovoditel' gruppy gosudarstvennogo spetsial'nogo konstruktorskogo byuro po khlopku (for Basevich, Rayev).

(Cotton machinery)

BASEVICH, M., nauchnyy sotrudnik

High cotton yields with the greatest economy of means.
Nauka i pered.op.v sel'khoz. 9 no.11:17-19 N '59.
(MIRA 13:3)

1. Uzbekskaya akademiya sel'skokhozyaystvennykh nauk.
(Cotton growing)

BASEVICH, S.N.

"Restoration of old caoutchouc and plastic prostheses; Stomatologiia no. 1, 1952.

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820002-4"

BASEVICH, T.

Min Higher Education USSR. Moscow Order of Labor Red Banner Construction Engineering Inst imeni V.V. Kuybyshev.

BASEVICH, T.: "Investigation of curved reinforced-concrete parts reinforced with cold-hardened steel." Min Higher Education USSR. Moscow Order of Labor Red Banner Construction Engineering Inst imeni V.V. Kuybyshev. Moscow, 1956 (Dissertation for the Degree of Candidate in Technical Sciences)

SO: Knizhnaya Letopis', No. 20, 1956

97-58-1-3/12

AUTHOR: Mikhaylov, K.V. Candidate of Mechanical Science.
Basevich, T. Candidate of Mechanical Science.

TITLE: Magnitude of the Coefficient of Working Conditions for Reinforced Concrete Constructions. (O velichine koeffitsiyenta usloviy raboty dlya naklepannoy armatury zhelezobetonnykh konstruktsiy.)

PERIODICAL: Beton i Zhelezobeton. 1958. No. 1 USSR Pp 13-19

ABSTRACT: The calculation of the strength of bent elements reinforced with cold rolled steel is given and it was investigated to the point of breaking. Formulae are presented and values for reinforcement are taken from norms NiTU 123-55. For tensioned reinforcement hot rolled steel Mark St. 5 is advocated. The coefficient of working capacity of reinforcement is introduced into the calculations. G.I. Berdichevskiy and K.V. Mikhaylov in the article on the calculation of constructions with a high tensile reinforcement published in Stroitel'naya Promyshlennost' 1955 No. 5 deals with this calculation. Special tests were carried out in the laboratories for reinforced concrete constructions TsNIPS to define the magnitude of the coefficient of working conditions of high tensile reinforcement. Figure 1 shows

Card 1/3

Magnitude of the Coefficient of Working Conditions for Reinforced Concrete Constructions.

the average working diagrams of high tensile steel. High tensile hot rolled reinforcement of standard profile Mark St.5 was used for the tests. Figure 2 shows the relationship between the degree of hardening during tensioning and the residual uniform elongation Tests of the load carrying capacity and properties at breaking point of bent reinforced concrete elements reinforced by hardened steel were carried out. A test sample of a beam is illustrated in Figure 3. The concrete used for these samples was Mark 200. Results of testing the strength of these beams are given in Table 1 It was found that the calculation of the strength of bent elements is based on given formulae and takes into account breaking values of the reinforcement and also that the way in which the beam breaks depends on the value of the uniform elongation of the tensioned reinforcement. Figure 4 shows a curve of relative load carrying capacity of tested beams reinforced with hot rolled reinforcement subjected to tensioning. Figure 5 a similar curve but for cold rolled and flattened reinforcement of standard profile and cold rolled thermally untreated reinforcement. Figure 6 is a diagram

Magnitude of the Coefficient of Working Conditions for Reinforced Concrete Constructions.

of the effect of the magnitude of the coefficient of working conditions of the reinforcement of bent elements on the crushing moment. The characteristic of the working diagram of the reinforcement is correlated to the curve of the lod carrying capacity of the beam. Figure 7 shows the relationship between the curve of the load bearing capacity of bent reinforced elements and the diagram of the tensioned reinforcement. The coefficient of the working conditions depends on the value of the crushing moment. Figure 8 shows the curve of maximum deflection of beams at breaking moment and Figure 9 gives practical and theoretical deformations of reinforcement. There are 9 Figures and 2 Tables.

Card 3/3 1. Reinforced concrete--Properties 2. Reinforcing steel--Mechanical properties 3. Reinforcing steel--Test methods 4. Structures --Stability

BASEVICH, V.

Passengers should be taken care of in an exemplary way. Mor.flot. 19 no.8:12-14 Ag '59. (MIRA 12:11)

1. Nachal'nik otdela passazhirskikh perevozok Glavflota Ministerstva morskogo flota.

(Merchant marine--Passenger accommodation)

BASEVICH, V.

Expand passenger service by means of the harbor craft fleet. Mor.flot. 19 no.11:9-11 N '59. (MIRA 13:3)

1. Nachal'nik otdela passazhirskikh perevozok Glavflota Ministerstva morskogo flota.
(Merchant Marine--Passenger traffic)

BASEVICH, Vadim Viktorovich; YAROVA, L.V., red.; TIKHONOVA, Ye.A., tekhn.red.

[On seas of the Far East] Po dal'nevostochnym moriam; kratkii putevoditel'. Moskva, Izd-vo "Morskoi transport," 1959. 98 p. (MIRA 12:9)
(Soviet Far East--Shipping)

BASEVICH, Vadim Viktorovich; KOROBTSOV, Viktor Ivanovich; GRUNIN, A.G., red.; YAROVA, L.V., red.izd-va; TIKHONOVA, Ye.A., tekhn.red.

[Marine passenger transportation in 1959-1965] Morskie passazhirskie perevozki v 1959-1965 gg. Moskva, Izd-vo "Morskoi transport," 1960. 83 p. (MIRA 13:10)
(Merchant marine--Passenger traffic)

~~BASEVICH, Vadim Viktorovich;~~ LAZAREVA, L.I., red.; LAVRENOVA, N.B., N.B., tekhn. red.

[Across the Far Eastern seas; concise guidebook]Po dal'ne-vostochnym moriam; kratkii putevoditel'. Izd.2., perer.i dop. Moskva, Izd-vo "Morskoi transport," 1962. 157 p. (MIRA 15:8)

(Soviet Far East--Guidebooks)

SAVIN, Nikolay Ivanovich; PUSTOVYY, P.V., inzh., retsenzent;

BASEVICH, V.V., inzh., retsenzent; KOLESNIKOV, V.G., inzh., red.; KSENOFONTOVA, Ye.F., red. izd-va; LAVRENOVA, N.B., tekhn. red.

[Planning marine passenger traffic]Planirovanie morskikh passazhirskikh perevozok. Moskva, Izd-vo "Morskoi transport," 1962. 201 p. (MIRA 15:10)
(Merchant marine—Passenger traffic)

BASEVICH, V.

Organization and thrift are a way toward the realization of profits. Mor. flot 22 no.8:5-7 Ag '62. (MIRA 15:7)

1. Nachal'nik otdela passazhirskikh perevozok Glavnogo upravleniya sudovogo khozyaystva Ministerstva morskogo flota SSSR.

(Merchant marine—Cost of operation)

BASEVICH, V.

Passenger areas in sea harbors. Mor. flot 23 no.1:13-15 Ja '63. (MIRA 16:4)

1. Nachal'nik otdela passazhirskikh perevozok Glavnogo upravleniya perevozok i dvizheniya flota Ministerstva morskogo flota SSSR.

(Harbors)

BA"VICH, V. IA.

"Diesel Engines for light automobiles"
A t. trakt. prom. No. 1, 1952

BASEVICH, V. Ya.

"The Physicochemical Nature of Spontaneous Combustion in Engines With Ignition Resulting From Compression." Cand Tech Sci, Inst of Chemical Physics, Acas Sci USSR, 24 Dec 54. (VM, 14 Dec 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

BASEVICH, V.Ya.; SOKOLIK, A.S.

Role of flame propagation in the combustion process of a diesel engine (with English summary in insert). Zhur.fiz.khim. 30 no.4:729-734 Apr. '56. (MLRA 9:9)

1. Akademiya nauk SSSR, Institut khimicheskoy fiziki, Moskva. (Flame) (Diesel engine)

Basevich, V. Ja.

120-6-22/36

AUTHOR: Basevich, V.Ya.

TITLE: A Photometric Method of Determination of the Number and Size of Drops of a Sprayed Fuel in a Stream (Fotometricheskaya metodika opredeleniya chisla i razmerov kapel' raspylennogo topliva v potoke)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.6, pp. 89 - 91 (USSR).

ABSTRACT: The method is based on the reflection of light from drops as they fall across a beam of light. The number of light pulses thus produced corresponds to the number of particles crossing the beam, while the size of the light pulse (the amount of the reflected light) corresponds to the size of the drop. The light pulses are recorded by a photoelectron multiplier and an oscillograph or a counting device. For the purposes of counting and amplitude analysis of the pulses, an electronic scheme used in scintillation counting was employed (Ref.4). The principle of the apparatus is illustrated in Fig.1. The instrument was calibrated using drops suspended on a very thin, metallic thread. The method can also be used to measure evaporation rates from drops. The diameter of a drop turns out to be a linear function of the square root of the amplitude of the pulse on the screen of the oscillograph

Card1/2

120-6-22/36

A Photometric Method of Determination of the Number and Size of Drops of a Sprayed Fuel in a Stream.

in the range 100 to 700 μ (Fig.4). There are 6 figures and 4 references, 3 of which are Slavic.

ASSOCIATION: Institute of Chemical Physics of the Ac.Sc. USSR (Institut Khimicheskoy Fiziki AN SSSR)

SUBMITTED: December 3, 1956.

AVAILABLE: Library of Congress

Card 2/2

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820002-4"

AUTHOR: Basevich, V. Ya. (Moscow).

TITLE: On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel. (O vliyanii predvaritel'nogo ispareniya na polnotu i ustoychivost' goreniya raspylennogo topliva).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, No.2, pp. 26-32 (USSR).

ABSTRACT: In studying the speed of combustion and the limits of stable combustion of droplet-air mixtures in a laminary flow and also of the stability of combustion of pulverised fuel in a turbulent flow, the state of the liquid phase (droplet diameter) is usually considered as the only parameter characterising the fuel-air mixture. However, the atomised fuel which enters into the combustion zone may assume as a result of evaporation various ratios of the gaseous to the liquid phase and it can be assumed that with an increase of the relative content of the vapour phase its role in the process of combustion will increase and in a number of cases will become dominant. The aim of the here described investigation was to detect the role of the preliminary evaporation of the atomised fuel, prior to its entry

Card 1/6

24-2-5/28

On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel.

into the reaction zone, on the completeness and stability of combustion. The experimental set-up shown diagrammatically in Figs.1, p.26, enabled producing fuel-air mixtures with various degrees of preliminary evaporation and incorporated a combustion chamber and a recording system. The degree of preliminary evaporation of the fuel in the air mixture at the entry into the combustion chamber was varied by changing the air temperature and the distribution of the nozzles at various distances from the combustion chamber. As fuels the following were used: gasoline with a specific weight of 0.754 g/cm^3 (b.p. 40-160°C), kerosene of 0.81-0.82 g/cm^3 (b.p. 180-290°C), benzole and fuel additives. The completeness of combustion and the speeds of combustion of the fuel were evaluated on the basis of analysis of gas samples taken along the axis of the combustion chamber at various distances from the inlet nozzle. In some cases, samples were taken from several points of the cross section and the values averaged. All the experiments were made for mixtures with a stechiometric

Card 2/6

On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel.

composition $\alpha = 1$. Typical results for various degrees of evaporation are entered in the graph, Fig.2. It can be seen from the obtained results and it is confirmed by results of analysis of various fuel-air mixtures of pure fuels as well as multi-component fuels that two zones can be distinguished in the combustion chamber. In the first zone a rapid increase in the CO_2 concentration and a rapid decrease in the O_2 concentration and also formation of appreciable quantities of CO with a maximum approximately in the middle of the zone are observed. In the second zone there is a slower increase of CO_2 and a decrease of O_2 with only insignificant or complete absence of CO. With decreasing degrees of evaporation, the dimensions of the first zone remain practically unchanged, whilst the dimensions of the second zone increase. This permits comparison of the combustion speeds on the basis of results of gas analysis along a certain length of the combustion chamber (750 mm in the given case) comprising in all cases the first combustion zone and a certain part of the second combustion zone. Due to the low CO content in the

On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel.

second zone it is possible to determine the combustion speed solely on the basis of the CO_2 content. Such evaluation is qualitative but adequate for solving the given problem. It was found that in the case of stable combustion, the completeness of combustion increases monotonously for the entire range of degrees of evaporations and assumes a maximum value for a completely evaporated mixture including the range of mixtures of the evaporated part of the fuel, which corresponds to the lower limit of the speed of flame propagation. Investigating the influence of turbulence, it was found that for average droplet diameters of 90 and 290 μ the completeness of combustion is not greatly affected by the degree of evaporation; the dependence of the speed of combustion on the droplet diameter was found to differ considerably from the quadratic relation which is characteristic in the case of combustion of the droplets in stationary air, see Rex, J.F., Fuhs, A.E. and Penner, S.S. (Jet Propulsion, Vol.26, 179, 1956). In an earlier paper (Ref.8), the author derived the following equation inter-relating the speed of combustion

24-2-5/28

On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel.

of a droplet G_T^K and the vapour phase of the fuel G_T^V for non-burning compositions of the mixture of the evaporated part of the fuel:

$$G_T^K/G_T^V = \varkappa\alpha_1 - 1 \qquad (1)$$

where $\varkappa$ is the ratio of the coefficients of diffusion of oxygen and the fuel during their travel from the surrounding medium to the combustion zone of the droplet. This formula is verified with experimental results and it is concluded that turbulent diffusion plays an important role during combustion of pulverised fuel in spite of the fact that the Reynolds number if small for the pertaining droplet dimensions. Comparison of the results obtained for the various fuels, taking into consideration the degree of preliminary evaporation, indicates that the boiling point of the fuel does not influence greatly the speed of combustion. The influence of the degree of evaporation and of the composition of the mixture on the flame stability are graphed in Figs.7-10 and the obtained results are discussed. Acknowledgments are made to S. M. Kogarko for his

Card 5/6

24-2-5/28

On the influence of preliminary evaporation on the completeness and stability of combustion of pulverised fuel.

assistance in carrying out the work. There are 10 figures, 1 table and 10 references - 2 Russian, 1 German, 7 English.

SUBMITTED: May 22, 1957.

ASSOCIATION: Institute of Chemical Physics Ac. Sc. USSR (Institut Khimicheskoy Fiziki AN SSR).

AVAILABLE: Library of Congress.

Card 6/6

BASEVICH, V.Ya.

SOV/30-58-9-44/51

AUTHOR: Sviridov, Yu. B., Candidate of Technical Sciences

TITLE: Combustion and Formation of the Mixture in Diesel Engines (Sgoraniye i smeseobrazovaniye v dizelyakh) Conference in Moscow (Konferentsiya v Moskve)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 9, pp. 115 - 117 (USSR)

ABSTRACT: The Laboratoriya dvigateley Akademii nauk SSSR (Engine Laboratory of the AS USSR) convened a conference which took place from June 10 to June 12. Apart from Soviet scientists from various cities of the USSR scientists from China, the German Democratic Republic and Czechoslovakia participated in the conference. Theoretical, experimental and methodical problems were treated. The following reports were delivered: I.I.Gershman, Ye.I.Gulin spoke about the influence of spraying on the process of combustion. V.Ya. Basevich on the empiric law of combustion of fuel drops in connection with spraying in the air current. Yu.B.Sviridov, D.I.Ryabov recommended a new diffusion kinetical model for the ingnition and combustion of sprayed fuel.

Card 1/4

A.N.Voinov spoke about self-ignition of homogeneous mixtures. R.V.Mokhov about the influence of chemical admixtures to the fuel on retarded ignition in the Diesel engine. A.S.Sokolik, O.A. Machalicky (Czechoslovakian scientist) reported on the physico-chemical basis of the so-called M-process in Diesel engines. N.R.Briling on an improvement of the stroke of Diesel engines by the construction of motors with short stroke. A.S.Sokolik, Ye.S.Semenov dealt with the investigation of the working cycle in the cylinder of the engine by means of a compensated thermo-anemometer. M.S.Khovakh investigated the influence of air turbulences on the torch formation of the fuel in the case of injection by means of the kinematographical method. V.Ye. Mazing spoke about screening of the intake valve. B.S.Stechkin about heat production in the engine and its influence on the stroke. I.I.Vibe, N.K.Arslanov, Z.M.Minkin, K.I.Genkin and others reported on the problem mentioned by Stechkin. A.S.Sokolik, V.P.Karpov dealt with the antechamber torch

ignition as basis of a new type of engines.
V.N.Svobodov recommended a new method of controlling the process of combustion in the Diesel engine.
Films about the process of combustion were shown which were produced by M.D.Apashev in the Laboratoriya dvigateley (Engine Laboratory). The following items were regarded as the principle trends in the development of Diesel engines: increase of the power output per liter of the engine by means of a supercharger, increase of the number of revolutions as well as fuel concentration. On the occasion of the 100th anniversary of Rudolf Diesel (Rudol'f Dizel) I.A.Men'shikov spoke about Diesel's life and work.

AUTHOR: Basevich, V. Ya. 76-32-5-20/47

TITLE: A Spectroscopic Investigation of the Turbulent Flame (Spektroskopicheskoye izucheniye turbulentnogo plameni)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 5, pp. 1077-1080 (USSR)

ABSTRACT: Among the spectroscopic investigations of laminary flames of hydrocarbons the observations by A. Geydon et al. (Ref 1) are of special interest, while in the present work the distribution of the intensity of radiations of C_2 and CH radicals is tried to be explained. Flames of homogeneous mixtures, as well as sprayed liquid fuels containing the evaporated and liquid phase, were investigated. The experiments were carried out in an open burner with a spray (compressed air blast) with a ИСП-22 spectrograph being used and the temperature being determined by means of the sodium D-line. From the experimental results can be seen that the dependence of the parameter i on the composition of the burning mixture with laminary flames, as well as with turbulent flames were investigated, and that for the same mixtures in the turbulent flame higher parameter values were obtained than in the laminary combustion. Besides a con-

Card 1/3

A Spectroscopic Investigation of the Turbulent Flame 76-32-5-20/47

stant ratio between the concentration of the excited C_2 and CH according to the width of the combustion zone, as well as a constant maximum temperature in the beginning and at the end of the combustion zone (1850°C) was observed in the turbulent flame, from which fact the author concludes that different from the laminary flame in every part of the turbulent combustion zone various stages of chemical conversion till to combustion take place. These data can, however, not serve for the differentiation of the turbulent flame according to Damköhler(Ref 2) and Shchelkin (Ref 3) and of the model according to Summerfield (Ref 4). The observation of the local concentration of the mixture in the combustion of sprayed fuels is explained by a partial disturbance of the diffusion mechanism of the drop combustion. Finally the author thanks Professor A. S. Sokolik for his help. There are 4 figures, and 4 references, 2 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki, Moskva (Moscow Institute of Physics and Chemistry, AS USSR)

SUBMITTED: January 15, 1957

Card 2/3

SOV/24-59-2-2/30

AUTHORS: Basevich, V. Ya., Kogarko, S. M. (Moscow)

TITLE: The Structure of Turbulent Flames of Homogeneous and Heterogeneous Mixtures (O strukture turbulentnogo plameni gomogennykh i geterogennykh smesey)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1959, Nr 2, pp 13-20 (USSR)

ABSTRACT: It is known that unreacted fuel can be detected in the jet of a turbulent flame, and even in the products of combustion. This supports existing pictures of the possible mechanism of turbulent flames, for instance, the surface model (Refs 1, 2), but insufficient quantitative evidence is at present available. The purpose of the paper is to study the temperature and concentration of the fuel and the velocity of combustion in turbulent flames, thus permitting an approach to the problem of their structure. The apparatus (Fig 1) consists essentially of an air heater (1), a tube (2) in which the fuel (benzene or kerosene) is mixed with the air, a combustion chamber (6) and a burner (7); the amount of vapour phase was measured by a special device (9-16). With this apparatus the completeness of combustion (η) of homogeneous mixtures was measured as a function of the length (L) of the combustion zone; η is defined by

SOV/24-59-2-2/30

The Structure of Turbulent Flames of Homogeneous and Heterogeneous Mixtures

the equation:

$$\eta = I - C/C_0 \qquad (1)$$

where C_0 is the initial concentration of benzene, and C is the concentration at a given point. In heterogeneous mixtures, the completeness of combustion was studied in relation to the size of the drops of atomised fuel. It is concluded that with homogeneous mixtures at 1 atmosphere pressure and temperature $\leqslant 125^{\circ}C$ there is a change of fuel concentration and a corresponding increase in the products of combustion with a conversion time <1 msec; the temperature of the air-fuel mixture in the combustion zone is near to its initial temperature. With heterogeneous mixtures and fuel drops of diameter 180-100 μ, the change in group diameter is satisfactorily described by Eq (1). For smaller drops ($\leqslant 80\mu$), Eq (1) has to be modified to allow for the

Card 2/3

SOV/24-59-2-2/30

The Structure of Turbulent Flames of Homogeneous and Heterogeneous Mixtures

probability of ignition and combustion of the drops. There are 12 figures, 2 tables and 5 references, 3 Soviet, 1 German and 1 English.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, Academy of Sciences, USSR)

SUBMITTED: October 27, 1958.

Card 3/3

11.4000

77063
SOV/62-59-12-7/43

AUTHOR: Basevich, V. Ya.

TITLE: Optimal Distribution of Droplets in Combustion of Partially Vaporized Fuel

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2112-2115 (USSR)

ABSTRACT: To determine optimal size distribution of droplets in a partially vaporized fuel jet, the author made theoretical calculations of combustion rate of the atomized fuel jet, droplets, and the vapor phase, at various stages of prevaporization. Calculations were made on the basis of the previously derived formula /Basevich, V. Ya., Zhur. Fiz. Khim., 31, 1619 (1957); Izvest. Akad. nauk SSSR. Otdel. Tekh. Nauk, Nr 2, 26 (1958)/:

Card 1/2

Optimal Distribution of Droplets in Combustion of Partially Vaporized Fuel

77063
SOV/62-59-12-7/43

$$\frac{G_T}{G_{TK}} = \frac{\varkappa}{\varkappa - 1/\alpha_H}, \quad (1)$$

Here G_T is overall combustion rate of the fuel, droplets, and vapor; G_{TK} is rate of combustion of droplets; $\varkappa$ is ratio of coefficients of diffusion of fuel and oxygen on being transferred into the combustion zone from the surrounding medium; α_H is composition of the mixture formed by the vaporized fuel. It is shown that rate and completeness of combustion of the partially evaporated fuel increase with decreasing droplet diameter, D_o, and with increasing distribution constant, m, for all degrees of preliminary vaporization. There are 3 figures; and 3 references, 2 Soviet, 1 U.K. The U.K. reference is: R. P. Probert, Phil. Mag., 37, 94 (1946).

ASSOCIATION: Institute of Chemical Physics of the Academy of Sciences, USSR (Institut fizicheskoy khimii Akademii nauk SSSR)

SUBMITTED: March 31, 1958

Card 2/2

5(4),11(4) SOV/76-33-5-19/33

AUTHORS: Basevich, V. Ya. (Moscow)

TITLE: Investigation of the Combustion Rate of Atomized Fuel in a Turbulent Flow (Issledovaniye skorosti goreniya raspylennogo topliva v turbulentnom potoke)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 5, pp 1080 - 1086 (USSR)

ABSTRACT: As a result of investigations carried out by western authors (Refs 1- 8), a linear dependence between the square of the drop diameter and the combustion rate was found: $D_o^2 - D^2 = k\tau$ (D_o = initial diameter, D= diameter after the amount of time τ, k = constant of the combustion rate). These values were obtained by model investigations which differ from the real conditions of combustion in a turbulent flow of high speed. This paper, therefore, deals with the derivation of values for k in a turbulent flow under certain conditions. The theoretical ratio of the combustion rates of the liquid phase and the evaporated phase was examined with the phase

Card 1/2

Investigation of the Combustion Rate of Atomized Fuel in a Turbulent Flow SOV/76-33-5-19/33

forming a mixture of noncombustible composition. Descriptions are given of the methods of measuring the distribution of the drops according to their size (Fig 1), the photographic recording of the flight paths of the drops (Figs 2,3), the measurement of the flying speed of the drops and the analysis of the combustion gases (Fig 4). Paraffin-petroleum (kerosene) with a specific weight of 0.82 g/cm^3 and boiling temperatures between 140 and 300° was used as a fuel. Curves of complete combustion (η) depending on time were plotted from the distribution of the drops according to size. The values of η were determined from the analysis of the combustion gases. Values of k are determined under consideration of the lengths of the flight paths of the drops and the flying speed (Table 1), and a mean value of 0.0059 cm^2/sec is obtained. The experimental results, especially the low values of k, show that combustion took place in a turbulent zone. There are 9 figures, 2 tables, and 10 references, 2 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR Institut khimicheskoy fiziki Moskva (Academy of Sciences USSR, Institute of Chemical Physics, Moscow)

SUBMITTED: October 24, 1957

Card 2/2

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820002-4"

05838

5(4) 11(1) SOV/76-33-10-36/45

AUTHORS: Kogarko, S. M., Devishev, M. I., Basevich, V. Ya.

TITLE: An Investigation of the Ignition of Gases in the Reaction Products of a Flame

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 10, pp 2345 - 2350 (USSR)

ABSTRACT: The authors investigated the retardation of ignition in mixtures of air and methane, n-butane, isooctane, (2,2,4-trimethyl pentane), and n-heptane which resulted from the combustion products of a diffusion-gas burner. For this purpose, they used a chamber which had been heated to 500-1500° at 1 atm electrically and by the combustion products of the diffusion flame. Experiments were made in an apparatus (Fig 1) which permitted automatic recording of the ignition retardation as well as an alteration of the distance between the flame and the gas entrance. Further, the absorption spectra of the hydroxyl groups were taken by means of an ISP-22 spectrograph, and the spectrogram was evaluated on an MF-2 microphotometer. The method by V. N. Kondrat'yev (Ref 2) was used to interpret the absolute concentration of the hydroxide. Results of calculation are listed in a table.

Card 1/3

05838
SOV/76-33-10-36/45

An Investigation of the Ignition of Gases in the Reaction Products of a Flame

It was found that within the temperature range 550-1150°C the ignition was retarded by 2-200 msec at 1 atm and depended greatly on the initial concentration of the active particles (OH radicals), i. e. a variation by one order (or more) may take place at the same temperature. The retardation of ignition is largely dependent on the distance between the gas entrance and the flame since the concentration of the OH radicals is reduced at a larger distance. It is assumed that a reduction of the apparent activation energy may be explained by an increase in the concentration of the active particles (especially of the hydroxyl). Under conditions similar to those of combustion in a turbulent gas flow (up to 1000 K) the retardations of ignition are longer than the time in which the gas remains in the zone of combustion of the hydrocarbon-air mixture. Consequently, it is assumed that combustion according to a homogeneous mechanism may be neglected in this zone since in this zone combustion obviously proceeds according to the mechanism of flame spreading. Publications by B. P. Mullin (Ref 3) and H. Sachsse (Ref 4) are mentioned here. There are 5 figures, 1 table, and 5 references,

Card 2/3

05838

An Investigation of the Ignition of Gases in the Reaction Products of a Flame

SOV/76-33-10-36/45

2 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki, Moskva (Academy of Sciences of the USSR, Institute of Chemical Physics, Moscow)

SUBMITTED: April 3, 1958

Card 3/3

5(4) SOV/20-127-1-37/65

AUTHORS: Kogarko, S. M., Devishev, M. I., Basevich, V. Ya.

TITLE: Investigation of the Influence of Active Particles of Reaction Products on the Burning Processes in a Flow (Issledovaniye vliyaniya aktivnykh chastits produktov reaktsii na protsessy goreniya v potoke)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 137-140 (USSR)

ABSTRACT: Figure 1 shows the experimental system. A hydrogen flame burns in a tube with heated air flow. A gas (lighting gas, methane, n-butane, n-propane) is introduced at a variable distance from the flame. The temperature is measured, at which the gas ignites at a given distance from the hydrogen flame. The concentration drop of OH-particles with increasing distance from the hydrogen flame at various temperatures was determined spectroscopically (Table 1). Methane (Fig 2) at a distance of 150 mm from the hydrogen flame and an air flow rate of 25 m/sec ignites already at 500°, while ignition at a distance of 650 mm (and equal air flow rate) occurs only at 1000°. This is explained by the influence of the active particles (OH, atomic O and H) forming

Card 1/2

in the hydrogen flame. These particles gradually recombine behind the hydrogen flame. If a combustible gas is introduced into the tube section, in which the concentration of such particles is still high, chemical processes take place, which accelerate ignition. Owing to this, also in the case of the activating energy of methane, 19 or 71 kcal/mol, depending on the distance from the hydrogen flame, were found. There are 4 figures, 1 table, and 2 Soviet references.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: January 20, 1959, by V. N. Kondrat'yev, Academician

SUBMITTED: December 29, 1958

BASEVICH, ~~M.~~ (Dr.), KOGARKO, S. M. (Prof.)
V. YA.

"On the Burning Probability of the Droplets of the Liquid Atomized Fuel in Turbulent Flow."

Advance List of Soviet Papers for Possible Presentation at the 8th International Combustion Symposium, Cal Tech--29 Aug-2 Sep 60.

BASEVICH, V. YA.

PHASE I BOOK EXPLOITATION SOV/4438

Akademiya nauk SSSR. Energeticheskiy institut

Goreniye pri ponizhennykh davleniyakh i nekotoryye voprosy stabilizatsii plameni v odnofaznykh i dvukhfaznykh sistemakh (Combustion at Reduced Pressures and Certain Problems in the Stabilization of the Flame in Single-Phase and Two-Phase Systems) Moscow, 1960. 85 p. Errata slip inserted. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Energeticheskiy institut imeni G. M. Krzhizhanovskogo.

Resp. Ed.: L. N. Khitrin; Ed. of Publishing House: Ye. N. Grigor'yev; Tech. Ed.: V. N. Karpov.

PURPOSE: This book is intended for scientists engaged in combustion research.

COVERAGE: The book contains five reports delivered at the Obshchemoskovskiy seminar po goreniyu (Moscow General Seminar on Combustion) in 1958. The problems discussed in these reports concern the effect of reduced pressure on the ignition and combustion of a stream of gas-vapor mixture in turbulent flow. Each report is followed by Soviet and other references.

Bovina, T. A. Study of Exchange Between the Recirculation Zone Behind a Stabilizer and the Outer Stream. Some Flame Stabilization Problems 58

A method for experimental determination of the residence time of gas in the recirculation zone behind a stabilizer for cold streams and during combustion is presented. It is based on the introduction of luminous particles into the zone and their photoelectric recording. Accuracy of residence time determination is from ± 7 to ± 8%. The material contains quantitative data on residence time and the diffusion coefficient for the recirculation zone. Temperature and combustion completeness measurements in the zone behind the stabilizer show that the zone of reverse streams is filled with complete combustion products (φ = 0.96-0.97). On approaching breakout, combustion completeness does not decrease in velocity nor in richness of the mixture composition, i.e., the gas temperature in the zone is close to the theoretical combustion temperature for a given excess air coefficient. It was determined experimentally that the initial burning point of a fresh mixture moves away from the end of the stabilizer as the mixture weakens and incoming stream velocity increases. This shift in torch origin is proportional to the stream velocity and depends exponentially on the temperature which corresponds to the combustion temperature at a given excess air coefficient of the mixture. A scheme for explaining the flame stabilization mechanism behind a poorly streamlined body is proposed. According to this scheme the determining factor in the stabilization process is the correlation between the time necessary for preparation of the mixture for burning and the contact time of the fuel mixture with the surface of the zone. The factors affecting the kinetics of the process evidently play the main role in the total time of preparation of the mixture for burning.

Basevich, V. Ya. Effect of Preliminary Vaporization on the Completeness and Stability of Burning of Atomized Fuel 71

It is shown that the degree of preliminary vaporization of atomized fuel is one of the determining factors of combustion completeness and flame stability. The theoretical correlation of the burning velocities of vapor- and liquid-phase fuel, which correctly describes qualitatively the experiment on the assumption of free turbulent transfer of matter to the reaction zone of the burning drops, is verified experimentally. A considerable effect of turbulence on burning velocity and stability for drops with an average diameter d_k > 190 mk is noted. Experiments on hydrocarbon fuels with different boiling points and inclination to low-temperature oxidation did not disclose the effect of type of fuel on completeness and stability of flame. It is concluded that propagation velocities of turbulent flame cannot serve as a basis for the determination of combustion completeness or of mass burning velocity of atomized fuel.

31588
S/124/61/000/011/037/046
D237/D305

11.7350

AUTHOR: Basevich, V.Ya.

TITLE: On the velocity of combustion of atomized fuel

PERIODICAL: Referativnyy zhurnal, Mekhanika, no.11, 1961, 104, abstract 11B694 (Sb. Sgoraniye i smeseobrazovaniye v dizelyakh, M., AN SSSR, 1960, 10 - 18)

TEXT: The value of diffusion constant of velocity of combustion of fuel drops in a high-velocity turbulent stream is determined experimentally. The experiments were performed on the set-up allowing the measurements of speed of complete combustion of droplets of fuel in a turbulent stream. Electrically preheated air was entering a pipe of inner diameter of 45 mm, with 12 openings, in one of which a sprayer with an atomizer giving narrow angle of dispersion, was placed centrally. Consumption of fuel in the sprayer was adjusted and determined by pressure of nitrogen, ejecting the fuel from the fuel tank. Paraffin was used as a fuel. The mixture of preheated air and fuel entered a combustion chamber of rectangular cross-section, with two quartz walls, the last feature making pho-

Card 1/3

31588
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On the velocity of combustion of ...

torecording possible. On two other sides two hydrogen burners were placed in order to stabilize a double oblique flame jet of atomized fuel. Methods of measurement used enabled the following to be recorded: Amount of CO_2, O_2 and CO in combustion products, consumption of fuel and air, degree of preliminary evaporation of fuel, composition of mixture in front of the flame, size distribution of fuel droplets in the stream on entering the combustion chamber, paths and velocities of droplets in combustion zone. From drop size distribution data, curves were constructed of dimensionless burn-out η against $k\tau$ for various mean drop diameters D_m (k - velocity of combustion constant, τ - time of total combustion of a drop of fuel). Gas analysis of combustion products in a given cross-section of the flame gave the value for actual burn out η, and that together with the $\eta(k\tau)$ curves gave numerical values for $k\tau$. The author then determined k, and τ was obtained from trajectories and velocities of the drops. In conclusion, the value for a diffusion constant of velocity of combustion of the drops of atomized pet. ether in a turbulent stream with initial temperature 20°C, normal atmospheric pressure was obtained as well as the mi-

Card 2/3

nimum critical drop diameter which, under the given conditions, localizes the diffusive region of combustion. 12 references. [Abstractor's note: Complete translation].

25416
S/137/61/000/006/005/092
A006/A101

11.7350

AUTHORS: Basevich, V.Ya., Kogarko, S.M.

TITLE: On some peculiarities of spray fuel combustion

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 6, 1961, 2, abstract 6B6 (V sb. "3-ye Vses. soveshchaniye po teorii goreniya, v. 2", Moscow, 1960, 40 - 47)

TEXT: Experiments were made on a device producing a turbulent air flow with sprayed fuel. The air velocity was varied from 10 to 55 m/sec, the temperature from - 25 to 200°C, the drop diameter from 10 to 350 μ, pressure was 1 atm. Photographs are presented showing the flame of sprayed fuel at various exposures. The time of existence in the turbulent combustion zone of fine drops may exceed by several times the combustion time of solitary drops. In the combustion zone of a turbulent flame the ignition and combustion of all the drops is not simultaneous. This can be taken into account if the combustion constant of individual drops, k, is multiplied by the function of combustion probability. The combustion mechanism is as follows: combustion of the fuel drops is accompanied by

Card 1/2

25416

On some peculiarities of spray fuel combustion S/137/61/000/006/005/092
A006/A101

the formation of individual and group zones; the value of constant k corresponds approximately to combustion of individual drops in the absence of convection; and the probability of combustion along the zone increases.

G. Glinkov

[Abstracter's note: Complete translation]

Card 2/2

28379 S/124/61/000/008/030/042
A001/A101

11.7100

AUTHORS: Kogarko, S. M., Devishev, M. I., Basevich, V. Ya.

TITLE: Investigation of the effect of active particles from reaction products on burning processes in a flow

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 8, 1961, 75-76, abstract 8B526 (V sb. "3-ye Vses. soveshchaniye po teorii goreniya T. 1". Moscow, 1960, 72-78)

TEXT: The authors investigated experimentally the effect of active particles forming in hydrogen diffusion flame, on the ignition of combustible mixture, boundaries of flow separation, and the flame propagation velocity in a turbulent flow. Active particles were injected in the processes investigated with different time intervals after their formation, obtaining thereby their different concentrations. For this purpose, the hydrogen burner was placed in the main air flow at different distances of the process investigated. The temperature of the combustible mixture, turbulence of the flow and concentration of hydroxyl were recorded in experiments. The investigation of ignition has shown that at different distances of ignition spot from the diffusion burner, ignition occurs at different

Card 1/2

29382

S/196/61/000/008/018/026
E194/E155

11.7320

AUTHOR: Basevich, V.Ya.

TITLE: The influence of preliminary vapourisation on the completeness and stability of combustion of atomised fuel

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.8, 1961, 8, abstract 8G80 (Sb. "Goreniye pri ponizhennykh davleniyakh i nekotoryye vopr. stabilizatsii plameni v odnofazn. i dvukhfazn. sistemakh" (Combustion at reduced pressures and certain problems of flame stabilisation in single and two-phase systems), M., AN SSSR, 1960, 71-85)

TEXT: An investigation was made of the influence of preliminary evaporation of atomised fuel on the completeness and stability of combustion. The fuel was vaporised by means of hot air in a pipe 45 mm in diameter and 2680 mm long. The degree of vaporisation was controlled by moving the atomising nozzle along the pipe and also by altering the air temperature from 20 to 120 °C. X

Card 1/3

29382

The influence of preliminary S/196/61/000/008/018/026
E194/E155

Two nozzles were used in the tests, giving fuel atomization with mean drop diameters d_k = 90 microns, and d_k = 200 microns. To make the flow turbulent three rods 8 mm in diameter were fitted at the inlet to the chamber. The combustion chamber was of square section, 40 x 40 mm at the inlet, with subsequent expansion to 135 mm; the chamber length was 900 mm. The fuels used were gasoline with a specific gravity of 0.757 g/cm^3 and a boiling range of 40 - 160 °C; kerosine with a specific gravity of 0.81-0.82 g/cm^3 and boiling range of 180 - 290 °C; and benzene. The fuel additives isoamylnitride and ethyl fluid P-9 were used. The degree of vaporisation of the fuel was checked by an instrument based on measuring the pressure in a closed vessel. The drop dimensions were determined by a special instrument in which the amount of light reflected from the drops was measured by a photoelectric multiplier. The completeness of combustion and the corresponding rate of fuel combustion were assessed by analysis of gas samples at points on the axis of the combustion chamber at different distances from the inlet. The tests were made for mixtures of stoichiometric composition with various degrees of atomisation, of turbulence, of flow speed and fuel type. It is concluded that, during stable

Card 2/3

29382

The influence of preliminary ... S/196/61/000/008/018/026
E194/E155

combustion, as the degree of vaporisation increases there is a steady rise in the completeness of combustion which reaches a maximum value when the fuel mixture is completely burned. Increasing the flow turbulence has a greater effect in increasing the rate of combustion of large drops with d_k greater than 190 microns than that of small drops. This observation agrees with theoretical considerations. Under the test conditions used, with hydrocarbon fuels of various boiling ranges and different tendencies to low-temperature oxidation, the type of fuel was found to have no influence on the completeness of combustion and stability of the flame. The rate of propagation of a turbulent flame cannot serve as a measure of the completeness of combustion and the mass rate of combustion of atomised fuel.

[Abstractor's note: Complete translation.]

Card 3/3

X

11.1000

80988

S/180/60/000/03/023/030
E071/E333

AUTHORS: Basevich, V.Ya. and Kogarko, S.M. (Moscow)

TITLE: On the Probability Value of Combustion of Droplets of Injected Fuel in a Turbulent Stream

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, Nr 3, pp 121-126 + 1 plate (USSR)

ABSTRACT: An attempt was made to determine which factors influence the value of probability of combustion of droplets of sprayed fuel under various combustion conditions. The apparatus used (Figure 1) consisted of a compressor, electric heater for preheating air, fuel injector and a combustion chamber. The flame was stabilised by two pilot burners burning town gas (75% of methane). By varying the air temperature the proportion of vapour phase in the combustion mixture could be varied within wide limits. As fuel, benzene and paraffinic kerosene were used. The amount of vapour phase in the combustion mixture was recorded by a special apparatus (not described). The data on the number and size distribution of droplets were obtained by the printing method. The details of determining local composition of the combustion mixture, etc.

Card1/3

4

80988
S/180/60/000/03/023/030
E071/E333

On the Probability Value of Combustion of Droplets of Injected Fuel in a Turbulent Stream

were given in Ref 1. The photographs of the combustion zone were made by the method of optical compensation using a rotating mirror (Ref 2) with and without additional illumination with a mercury lamp. The experimental conditions are given in the table; the dependence of the concentration of droplets on their diameter for various cross-sections along the length of the combustion chamber - Figure 2; the dependence of group diameter of droplets during combustion on time - Figure 3; calculated values of probability of combustion on time - Figure 5; photographs of the combustion zone - Figure 4. It was found that an increase in the velocity of the stream and diameter of droplets somewhat decreases the value of the probability of combustion and an increase in the power of the stabilising pilot flames - increases it. The composition of the combustion mixture within the range of excess air coefficient $\alpha = 1.67 - 5.5$ has a strong influence on the probability of combustion, whereupon already at $\alpha = 1.67$ the probability of combustion approaches unity

Card2/3

80988

S/180/60/000/03/023/030
E071/E333

On the Probability Value of Combustion of Droplets of Injected Fuel in a Turbulent Stream

within the first few milliseconds. The presence of the vapour phase in the stream at the same average composition of the mixture substantially influences the probability of combustion. There are 5 figures, 1 table and 6 references, 4 of which are Soviet and 2 English.

SUBMITTED: December 16, 1959

Card 3/3

80954
S/024/60/000/03/017/028
E081/E441

26.1000

AUTHORS: Basevich, V.Ya., Devishev, M.I. and ~~Kogarko, S.M.~~ (Moscow)

TITLE: Influence of Active Particles of Combustion Products on Flame Propagation Velocity in Turbulent Flow

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1960, Nr 3, pp 138-144 (USSR)

ABSTRACT: The apparatus is shown in Fig 1 (1 - tube, 2 - electric heater, 3 and 4 - hydrogen burners, 5 - rectifying device, 6 - mixer, 7 - jet, 8 - burner of pilot flame, 9 - stabiliser): the active particles were created by burning hydrogen either at 3 (distance (L) from tube section = 3000 mm) or at 4 (L = 400 mm). Experiments were carried out on town gas and propane. Fig 2 shows the temperature (1 and 1') and velocity (2 and 2') fields across the tube with the point 0 on the tube axis. Fig 3 is a photograph of propane flames (composition of mixture $\alpha = 1.4$, $T = 360°$, $Re = 50000$) and shows that the intensity and spread of the flame are both influenced by the concentration of active particles. Fig 4 shows the change in half-distance between maximum brightnesses (y)

Card 1/3

80954
S/024/60/000/03/017/028
E081/E441

Influence of Active Particles of Combustion Products on Flame Propagation Velocity in Turbulent Flow

with distance along the flow axis (x). Fig 5 the influence of initial concentration of active particles on the velocity of flame propagation for mixtures of different constitution and Fig 6 the influence of initial concentration of active particles on the velocity of flame propagation at different temperatures: for Fig 4, 5 and 6 the working material was town gas. Fig 7 shows the influence of initial concentration of active particles on the flame propagation velocity in mixtures of different gases (town gas, propane and hydrogen) and Fig 8 the influence of initial concentration on the luminous intensity of the flames. The conclusions are: (1) The velocity of flame propagation in turbulent flow was increased by introducing an initial concentration of active particles from a burning reaction in the initial mixture. (2) Introduction of active particles increases the luminous intensity of the flame as a result of the increase in reaction velocity in the inception zone. There are 8 figures, 2 tables and 7 references, 4 of which are Soviet and 3 English.

Card 2/3

4

80954
S/024/60/000/03/017/028
E081/E441

Influence of Active Particles of Combustion Products on Flame Propagation Velocity in Turbulent Flow

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences USSR)

SUBMITTED: June 25, 1959

Card 3/3

28881
S/180/61/000/004/020/020
E071/E180

11.7350

AUTHORS: Kogarko, S.M., and Basevich, V.Ya. (Moscow)

TITLE: On the mechanism of combustion of sprayed liquid fuel in a turbulent flow

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no. 4, 1961, 137-142

TEXT: It was shown in the authors' previous work (Ref.2: V.Ya. Basevich, S.M. Kogarko, Izv. AN SSSR, OTN, Energetika i avtomatika, 1959, No.2, p.13) that combustion takes place according to a diffusion mechanism in respect of fuel droplets. This mechanism would be violated if part of the fuel was evaporated in the flame zone without immediate combustion, thus leading to an accumulation of fuel in some part of the flame zone. In the above mentioned work the possible amount of the vapour phase was assessed from the difference in the amount of the liquid phase and the amount of combustion products. This assessment is liable to errors; therefore in the present work the authors made an evaluation of vapour concentration in the flame zone of atomised fuel and

Card 1/3

28881

On the mechanism of combustion of S/180/61/000/004/020/020
E071/E180

1) the mechanism of combustion is diffusive in respect of fuel drops. No disturbances of this mechanism, leading to an accumulation of fuel vapour in the flame zone, were observed. 2) If fuel vapours form in front of the flame zone, they burn either by a simultaneous diffusion with oxygen towards the combustion zone of fuel drops, or they form an independent zone of combustion. 3) In weak mixtures, a preliminary partial evaporation of the fuel is permissible only if it leads to the formation of an independent combustion zone, as otherwise the evaporated fuel cannot be completely burned.

There are 7 figures, 1 table and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The English language reference reads:

Ref.1: C. Graves, M. Gerstein. Some aspects of combustion of liquid fuel. Combustion Res. and Reviews, p.25. London, Butterworths Sc. Pb., 1955.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR
(Institute of Chemical Physics, AS USSR)

SUBMITTED: January 16, 1961

Card 3/3

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820002-4"

28881

On the mechanism of combustion of S/180/61/000/004/020/020
E071/E180

1) the mechanism of combustion is diffusive in respect of fuel drops. No disturbances of this mechanism, leading to an accumulation of fuel vapour in the flame zone, were observed. 2) If fuel vapours form in front of the flame zone, they burn either by a simultaneous diffusion with oxygen towards the combustion zone of fuel drops, or they form an independent zone of combustion. 3) In weak mixtures, a preliminary partial evaporation of the fuel is permissible only if it leads to the formation of an independent combustion zone, as otherwise the evaporated fuel cannot be completely burned.
There are 7 figures, 1 table and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The English language reference reads:
Ref.1: C. Graves, M. Gerstein. Some aspects of combustion of liquid fuel. Combustion Res. and Reviews, p.23. London, Butterworths Sc. Pb., 1955.
ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AS USSR)
SUBMITTED: January 16, 1961

Card 3/3

26546
S/076/61/035/008/010/016
B110/B101

11.7200

AUTHORS: Kogarko, S. M., and Basevich, V. Ya. (Moscow)

TITLE: Model of the combustion zone of a turbulent flame

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 8, 1961, 1794 - 1798

TEXT: None of the various planar and spatial model representations of the combustion zone of homogeneous mixtures in a turbulent flow is universally accepted. The authors established that the nonreactive mixture in the combustion zone had a temperature near the initial temperature, which was a point in favor of a planar model.. Objections were raised against this statement. According to Ye. S. Shchetinkov et al. (O turbulentnom gorenii gomogennoy smesi, Oborongiz, 1956, p. 31) a perturbation of planar combustion is probable. An attempt is made here to explain the observations by the planar model, and the effect of the feed of combustion products upon the luminosity of the turbulent flame is examined. The system shown in Fig. 1 consists of an air compressor, electric heater 1, mixer for fuel feed 2, H_2O and CO_2 feed 3, and sealed combustion chamber 4 with quartz side walls, in which the two-dimensional flame flare

Card 1/5

26546
S/076/61/035/008/010/016
B110/B101

Model of the combustion...

is stabilized by means of two hydrogen burners. The luminosity was recorded from a major distance by means of a photomultiplier with a light filter. The other system (II) was similar to (I), but an auxiliary burner for the combustion of some fuel was in the place of 2, and the mixer was in the place of 3. The combustion chamber was open and a directional two-dimensional flare burned at the wedge-shaped stabilizer. The luminosity was determined both photographically and photometrically. In accordance with the authors (Ref. 11: Izv. AN SSSR. Otd. tekhn. nauk, energ. i avtom., No. 3, 138 - 144, 1960), the maximum of darkening in a certain cross section behind the stabilizer was taken as the measure of intensity. Consumption was determined by diaphragms and pilot tubes, and the excess-air α was additionally determined by chemical analysis and the temperature of the combustion products. The relative light yield of the flame per unit of converted fuel at various velocities of flow v of sewer gas andpr[redacted]ixture (25°C initial temperature) with turbulence degree 12 % was measured on (I) (Fig. 2). The drop of the relative light yield with a rise of velocity was caused by the poor mixture (α = 5.63), and no turbulent flame property was responsible for it. The opposite was established in case of air-hydrogen mixtures. A drop of intensity in

Card 2/5

26546
S/076/61/035/008/010/016
B110/B101

Model of the combustion...

system II was caused by small additions of reaction products of the propane-butane flame with equal excess-air coefficients to sewer gas. A quick rise of intensity was established on (II) by addition of reaction products of the hydrogen flame with free atoms and radicals. In (I), CO_2 and H_2O were added to the fuel mixture; a CO_2 addition $>$ 30% of its amount in the combustion products had little effect. 0 - 12% of H_2O addition reduces the maximum luminosity by 10 - 15%. The authors have shown that an addition of combustion products of the diffusing hydrogen flame augments the luminous intensity of the turbulent hydrocarbon-air flame. Here, additions of reaction products of the hydrocarbon-air flame reduce the luminous intensity. Thus, the action of the combustion products depends upon the ratio: active radical particles (A) versus stable reaction products (H_2O) (B). (A) raises the luminous intensity, while (B) reduces it. This also entails a rise of the relative light yield with an increase of velocity in case of hydrogen-air flames, and the drop of it in case of hydrocarbon-air flames. Since the feed of active radical particles of the hydrogen flame raises the propagation velocity of the flame in the turbulent flow, a feed of reaction products cannot be

Card 3/5

expected to raise the velocity perpendicular to the surface element. With equal propagation velocity of the turbulent flame, a feed of higher concentrations of active particles into the hydrocarbon-air flame caused in many cases a lesser relative velocity rise than a small feed into the hydrogen-air flame. Divergences among the lines of maximum luminous intensity for some radicals and excited molecules are explained as follows: the initial mixture intermixes with the combustion products, amount to $\leqslant$ 10% of the fresh mixture. Thus, different actions of reaction products upon the luminous intensity of radicals and molecules effects separation in the zone of luminous-intensity maxima. Stable (H_2O, CO_2) and unstable combustion products effect extinction. The dissimilar changes of the relative light yield with a rise of velocity at different wavelengths, especially with C_2 and CO_2, point to a stronger mixing at the beginning of the zone. There are 5 figures, 2 tables, and 11 references: 6 Soviet-bloc and 5 non-Soviet-bloc. The three most important references to English-language publications read as follows: Ref. 3: M. Summerfield et al., Jet Propulsion, 25, 377, 1955. Ref. 6: J. H. Grover et al., ARS Journal, 29, 275, 1959. Ref. 8: R. R. John: Jet Propulsion, 27, 169, 1957.

26546
S/076/61/035/008/010/016
B110/B101

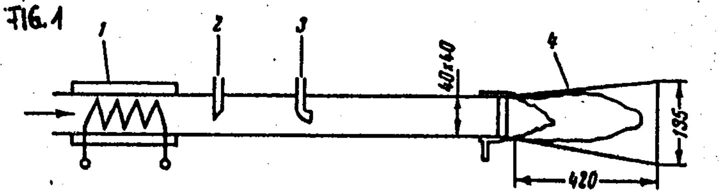
Model of the combustion...

ASSOCIATION: Akademiya nauk SSSR Institut khimicheskoy fiziki g. Moskva (Academy of Sciences, USSR, Institute of Chemical Physics, Moscow)

SUBMITTED: December 14, 1959

Fig. 1. Scheme of burner.

FIG. 1



Card 5/6

28292
S/076/61/035/010/011/015
B106/B110

11.7200

AUTHORS: Kogarko, S. M., Mikheyev, V. V., and Basevich, V. Ya.

TITLE: Effect of active particles of combustion products on the limits of inflammability in a turbulent flow

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 10, 1961, 2341 - 2347

TEXT: In continuation of earlier papers on the effect of active particles (O, H, OH) on spontaneous inflammation, stabilization of flame, and rate of propagation in a turbulent flow (Ref. 1: S. M. Kogarko, M. I. Devishev, V. Ya. Basevich, Zh. fiz. khimii, 33, 2345, 1959; Ref. 2: S. M. Kogarko, M. I. Devishev, V. Ya. Basevich, Dokl. AN SSSR, 127, 137, 1959; Ref. 3: V. Ya. Basevich, M. I. Devishev, S. M. Kogarko, Izv. AN SSSR, Otd. tekhn. n., No. 3, 138, 1960), the authors studied the effect of active particles formed in the combustion products of hydrogen and hydrocarbons (O, H (atomic), OH) on the limits of inflammability of fuel gases in a turbulent air flow. Fig. 1 shows the scheme of the experimental plant.

The tube had a rectangular section of 40 by 70 mm^2. No initial concentration of active particles was to occur at inflammation in the experiments,

Card 1/4

28292 S/076/61/035/010/011/015
B106/B110

Effect of active particles...

in which hydrogen was burnt in burner 2. The distance between burner 2 and ignition point (2000 mm) allowed recombination of the active particles before reaching the ignition point. In the combustion in burner 3 which was only 400 mm distant from the ignition point, the active particles reached the ignition point. The concentration of active particles could be changed by introducing surfaces with different coats (quartz, carbon black, graphite, potassium tetraborate) between burnerand ignition point. The degree of turbulence of flow was 7 - 10%, scale 3 - 5 mm (Ref. 3, see above). In a series of experiments, a butane-propane mixture was burnt with air instead of hydrogen. This required a special burner. In most cases, the ignition of fuel gases was initiated by sparks of an energy of 0.02 joules with an electrode spacing of 1.8 mm; in some cases, for comparison, by a burner or heated body. n-butane, a mixture of 77% n-butane and 23% isobutane, hydrogen, and sewer gas (mainly methane) were used as fuel gases. In the experiments, the upper and lower limits of inflammability and flame stabilization of the fuel-air mixture were determined by corresponding regulation of fuel supply. These studies showed that in all cases (ignition by spark, by a burner, by a heated body; different temperatures; different flow rates; different fuel gases) an increase in initial concentration of active particles led

Card 2/4

to a considerable decrease of the lower limit of inflammability of the fuel-air mixture. This extension of limits of inflammability increases with rising concentration of active particles and can be explained by the rise of reaction rate in the initial stage of combustion. The upper limit of inflammability was not changed by the active particles. It is assumed that the reason therefore was only an insufficient concentration of active particles and the low range of flow rates (10 - 50 m/sec) at which the experiments were carried out. There is no reason to assume that the upper limit of inflammability is not increased by the effect of active particles. In the combustion of hydrocarbons obviously fewer active particles are formed than in the combustion of hydrogen, since in the former case the limits of inflammability of fuel gases are not so wide. The concentration change of active particles in the flow by introduction of surfaces with different coats changes the limits of inflammability according to the probability of recombination of active particles on the introduced surface. In the case of ignition by burner the limits of inflammability are higher than in the case of spark ignition and are still considerably widened by introduction of active particles. There are 8 figures, 3 tables, and 6 references: 4 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: I. R. Arthur, Nature, London, 164, 537, 1949; C. P. Fenimore, G. W. Jones, J. Phys. Chem., 62, 178, 1958.

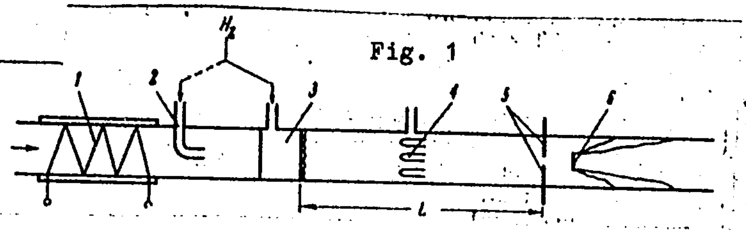
ASSOCIATION: Akademiya nauk SSSR Institut khimicheskoy fiziki (Academy of Sciences USSR Institute of Chemical Physics)

SUBMITTED: March 4, 1960

Fig. 1. Scheme of the plant.

Legend: (1) Electrical heating; (2,3) hydrogen diffusion burner, (4) mixing device; (5) electrodes; (6) stabilizer.

Fig. 1



30724

S/020/61/141/003/012/021
B101/B117

11.7400

AUTHORS: Basevich, V. Ya., and Kogarko, S. M.

TITLE: Effect of oxygen atoms on low-temperature burning

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 3, 1961, 659-661

TEXT: The study is based on the assumption of a uniform mechanism for atomic and ordinary flames, and on the importance of the initial concentration of active centers. The effect of atomic O on the velocity of flame propagation at low pressure was investigated. Further, it should be established whether the lower pressure limit of burning can be lowered to the range of atomic flames. The oxygen atoms were obtained by glow discharge, and entered the reaction vessel through a 4 mm nozzle. The fuel gas, industrial propane + butane, entered the reaction vessel through an annular clearance (width 1 mm) concentric with the nozzle. Ignition occurred in the reaction vessel by an electric spark, energy $\sim$0.45 joules. A net of 15 μ thick wire was attached before the nozzle, thus causing recombination of the O atoms. Recombination heat and gas temperature were measured with a thermocouple (diameter 0.2 mm). The gas

Card 1/3

30724

was sucked from the reaction vessel through a receiver by means of a fore-pump. The visible velocity of flame propagation was photorecorded through a slit. Tests were made: (1) with glow discharge switched off; (2) with glow discharge switched on, and a net before the nozzle; partial or total recombination occurred; this was observed with the aid of the afterglow of NO_2, forming from N_2 residues in the oxygen, and the thermocouple recording; temperature of the thermocouple joint with maximum discharge current ($i_2 \leqslant 900$ ma) was $< 60^{\circ}C$; without a net, it was $420^{\circ}C$; (3) with glow discharge switched on and without a net. In the first test series, the spacing between glow electrodes was 170 mm. Fig. 2a shows the visible velocity U_{vis} of the flame as a function of the coefficient α of the excess oxygen, P = 43 mm Hg. The spark discharge was chosen so strong that no self-ignition occurred with rich mixtures ($\alpha = 0.75$). This explains the apparently low effect of oxygen atoms in this range. Fig. 2б shows U_{vis} as a function of pressure at $\alpha = 3$. Fig. 2в shows U_{vis} as a function of the spark discharge intensity. U_{vis} remained constant in a discharge with net, or with glow discharge switched off. The second test

Card 2/4 3

Effect of oxygen atoms on....

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series dealt with the possibility of lowering the pressure limit of burning. The electrode spacing was varied up to 1000 mm. A pressure limit of 10 mm Hg was found at $i_2 < 400$ ma. In a discharge without a net, this value dropped to 4.5 mm Hg. Increase of the discharge current to 900 ma caused self-ignition at 2 mm Hg which already lies in the range of atomic flames. With faster evacuation and wider electrode spacing it should be possible to lower the pressure limit to 0.1-4 mm Hg; in this range, it is possible to carry out tests with atomic flames. There are 3 figures and 10 references: 6 Soviet and 4 non-Soviet. The two most recent references to English-language publications read as follows: S. W. Churchill, A. Weir, K. L. Gealer, K. I. Kelley, Ind. and Eng. Chem., 49, 1419 (1957); A. G. Gaydon, H. G. Wolfhard, Proc. Roy. Soc., A213, 366 (1952).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: May 12, 1961, by V. N. Kondrat'yev, Academician

SUBMITTED: May 12, 1961

Card 3/3

L 01113-66 EPA/EWT(m)/T/EWA(c) WW/JW/RM/HE

ACC NR: AP6002163 SOURCE CODE: UR/0195/65/006/006/0968/0976

44 55 44 55

AUTHOR: Basevich, V. Ya.; Kogarko, S. M. 63

44 55

ORG: Institute of Chemical Physics, AN SSSR (Institut khimicheskoy fiziki AN SSSR) B

TITLE: The phenomenology of atomic-oxygen flames

SOURCE: Kinetika i kataliz, v. 6, no. 6, 1965, 968-976

TOPIC TAGS: flame, combustion, propulsion, combustion kinetics, reaction mechanism

,44,55

ABSTRACT: Hydrocarbon combustion at low pressures is a problem of practical importance. Atomic flames are examples of combustion at low pressure (on the order of a few mm). The purpose of this work was the investigation of atomic oxygen flames, the causes of their origin and the factors which affect the extent of combustion. The following experimental apparatus was used:

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ACC NR: AP6002163

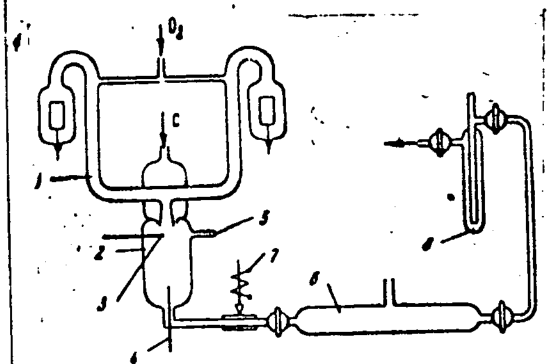

Fig. 1. Diagram of the apparatus

1 - Discharge tube; 2 - reservoir; 3, 4 - thermocouples; 5 - pressure measurement tap; 6 - sampling tube; 7 - electromagnetic valve; 8 - cold trap; C - fuel feed

The main hydrocarbon-combustion products in atomic flames are identical with those of conventional flames: H_2O, CO_2, CO and H_2. In addition, very small amounts of incomplete combustion products are present. Analysis of the tabulated combustion data indicates that the completeness of combustion increases with the increasing rate of the primary reactions of oxygen atoms. The ratio of the reaction products to the amount of atomic oxygen introduced indicates that a chain reaction takes place. Termination, however, predominates apparently over chain branching, since a flame cannot be sustained under experimental conditions without a constant supply of oxygen atoms. The reaction probably

ACC NR: AP6002163

consists of straight-chain processes, without autocatalysis. A correlation exists between the extent of the reaction (extent of conversion) and the ratio of the primary-reaction rate W for oxygen atoms and the critical rate of self-heating W_{cr}. The extent of conversion increases with increasing W/W_{cr}. The authors feel that such an explanation, considering only the primary reaction, is sketchy rather than comprehensive. Complete analysis of the generation of atomic flames and of the existence of partial combustion in them is contingent on the knowledge of the mechanism of hydrocarbon oxidation in the course of combustion. Orig. art. has: 5 figures and 1 table. [VS]

SUB CODE: 21/ SUBM DATE: 09Jan64/ ORIG REF: 010/ OTH REF: 012
ATD PRESS: 4176

Card 3/3

L 41277-66 EWT(1)/EWT(m)/T WW/JW/WE

ACC NR: AP6029763 (N) SOURCE CODE: UR/0414/66/000/002/0107/0109

AUTHOR: Vavilov, A. N.; Kogarko, S.M.; Basevich, V. Ya.

ORG: none

60 B

TITLE: The effect of active particles on flame stabilization at low pressures

SOURCE: Fizika goreniya i vzryva, no. 2, 1966, 107-109

TOPIC TAGS: combustion, air breathing engine, combustion stability, flame stabilization

ABSTRACT: Experiments were made to determine the effect of active flame species, such as radicals and atoms (OH, H, O), on the stability of turbulent combustion of natural gas-air mixtures with respect to pressure and flow velocity. At a constant air flow, the gas flow rate was gradually decreased until the flame separated from the flame holder. This procedure was repeated at various pressures ranging from 20 to 300 mm Hg and flow velocities of 5—35 m/sec. Plots of the gas flow rate vs pressure and velocity were obtained delineating the regions of stable combustion with and without active flame species. The latter were introduced in the form of combustion products. It was shown that active flame species widen the stability region of lean mixtures by 40—60% and of rich mixtures by 5—15%. It is concluded that acceleration of the combustion rate by introduction of active flame species substantially lowers the pressure limit for stable combustion. Orig. art. has: 3 figures. [PV]

SUB CODE: 21/ SUBM DATE: 16Dec65/ ORIG REF: 006/ OTH REF: 004/ ATD PRESS: 5077

Card 1/1 hs UDC: 536.468

L 20611-66 EWT(m)/T/EWP(t) IJP(c) WW/JW/WE/JD

ACC NR: AP6010753 SOURCE CODE: UR/0076/66/040/003/0744/0746

AUTHOR: Basevich, V. Ya.; Kogarko, S. M.

ORG: Institute of Chemical Physics, Academy of Sciences SSSR (Institut Khimicheskoy Fiziki, Akademii nauk SSSR)

53

B

TITLE: Discharge tube as a source of atomic oxygen

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 3, 1966, 744-746

TOPIC TAGS: oxygen atom, oxygen, radical, combustion, propulsion

ABSTRACT: Until now, flow discharge tubes for generating atomic gases have been empirically developed to yield a maximum of atomic gas. In the present study, an equation describing the concentration profile in a glow discharge tube was solved to obtain an expression for the oxygen atom concentration as a function of tube length, oxygen concentration, power input, and diffusion coefficients. The results showed that the maximum concentration of oxygen atoms is obtained at an optimum length of the discharge tube. A further increase in the tube length increases only the electric power consumption, but does not increase the oxygen atom concentration. Orig. art. has: 8 formulas and 2 figures. [PV]

SUB CODE: 21/ SUBM DATE: 21Apr65/ ORIG REF: 001/ OTH REF: 005/ ATD PRESS: 4224

Card 1/1 UDC: 075.5

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